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1 [Experience distributing objects in an SMMP OS](#)



Jonathan Appavoo, Dilma Da Silva, Orran Krieger, Marc Auslander, Michal Ostrowski, Bryan Rosenberg, Amos Waterland, Robert W. Wisniewski, Jimi Xenidis, Michael Stumm, Livio Soares

August 2007 **ACM Transactions on Computer Systems (TOCS)**, Volume 25 Issue 3

Publisher: ACM Press

Full text available: pdf(751.56 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

Designing and implementing system software so that it scales well on shared-memory multiprocessors (SMMPs) has proven to be surprisingly challenging. To improve scalability, most designers to date have focused on concurrency by iteratively eliminating the need for locks and reducing lock contention. However, our experience indicates that locality is just as, if not more, important and that focusing on locality ultimately leads to a more scalable system.

In this paper, we describe a met ...

Keywords: Concurrency, Distribution, Locality, Scalability SMMP

2 [Real-time shading](#)



Marc Olano, Kurt Akeley, John C. Hart, Wolfgang Heidrich, Michael McCool, Jason L. Mitchell, Randi Rost

August 2004 **ACM SIGGRAPH 2004 Course Notes SIGGRAPH '04**

Publisher: ACM Press

Full text available: pdf(7.39 MB) Additional Information: [full citation](#), [abstract](#)

Real-time procedural shading was once seen as a distant dream. When the first version of this course was offered four years ago, real-time shading was possible, but only with one-of-a-kind hardware or by combining the effects of tens to hundreds of rendering passes. Today, almost every new computer comes with graphics hardware capable of interactively executing shaders of thousands to tens of thousands of instructions. This course has been redesigned to address today's real-time shading capabili ...

3 [Spatial augmented reality: a modern approach to augmented reality: Modern approaches to augmented reality](#)



Oliver Bimber, Ramesh Raskar

July 2005 **ACM SIGGRAPH 2005 Courses SIGGRAPH '05**



Publisher: ACM Press

Full text available: pdf(48.93 MB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

This tutorial discusses the Spatial Augmented Reality (SAR) concept, its advantages and limitations. It will present examples of state-of-the-art display configurations, appropriate real-time rendering techniques, details about hardware and software implementations, and current areas of application. Specifically, it will describe techniques for optical combination using single/multiple spatially aligned mirror-beam splitters, image sources, transparent screens and optical holograms. Furthermore, ...

4 Special issue: AI in engineering



D. Sriram, R. Joobhani

April 1985 **ACM SIGART Bulletin**, Issue 92

Publisher: ACM Press

Full text available: pdf(8.79 MB) Additional Information: [full citation](#), [abstract](#)

The papers in this special issue were compiled from responses to the announcement in the July 1984 issue of the SIGART newsletter and notices posted over the ARPAnet. The interest being shown in this area is reflected in the sixty papers received from over six countries. About half the papers were received over the computer network.

5 The multics system: an examination of its structure

Elliott I. Organick

January 1972 Book

Publisher: MIT Press

Additional Information: [full citation](#), [abstract](#), [references](#), [cited by](#), [index terms](#)

This volume provides an overview of the Multics system developed at M.I.T.--a time-shared, general purpose utility like system with third-generation software. The advantage that this new system has over its predecessors lies in its expanded capacity to manipulate and file information on several levels and to police and control access to data in its various files. On the invitation of M.I.T.'s Project MAC, Elliott Organick developed over a period of years an explanation of the workings, concep ...

6 Stateful distributed interposition



John Reumann, Kang G. Shin

February 2004 **ACM Transactions on Computer Systems (TOCS)**, Volume 22 Issue 1

Publisher: ACM Press

Full text available: pdf(833.84 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

Interposition-based system enhancements for multitiered servers are difficult to build because important system context is typically lost at application and machine boundaries. For example, resource quotas and user identities do not propagate easily between cooperating services that execute on different hosts or that communicate with each other via intermediary services. Application-transparent system enhancement is difficult to achieve when such context information is obscured by complex servic ...

Keywords: Distributed computing, component services, distributed context, multitiered services, operating systems, server consolidation


7 Highly available systems for database applications



Won Kim

March 1984 **ACM Computing Surveys (CSUR)**, Volume 16 Issue 1

Publisher: ACM Press

Full text available:  pdf(2.43 MB)

Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#), [review](#)

As users entrust more and more of their applications to computer systems, the need for systems that are continuously operational (24 hours per day) has become even greater. This paper presents a survey and analysis of representative architectures and techniques that have been developed for constructing highly available systems for database applications. It then proposes a design of a distributed software subsystem that can serve as a unified framework for constructing database applica ...


8 EROS: a fast capability system



Jonathan S. Shapiro, Jonathan M. Smith, David J. Farber

December 1999 **ACM SIGOPS Operating Systems Review , Proceedings of the seventeenth ACM symposium on Operating systems principles SOSP '99**, Volume 33 Issue 5

Publisher: ACM Press

Full text available:  pdf(1.83 MB)

Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

EROS is a capability-based operating system for commodity processors which uses a single level storage model. The single level store's persistence is transparent to applications. The performance consequences of support for transparent persistence and capability-based architectures are generally believed to be negative. Surprisingly, the basic operations of EROS (such as IPC) are generally comparable in cost to similar operations in conventional systems. This is demonstrated with a set of microbe ...

9 System support for pervasive applications



Robert Grimm, Janet Davis, Eric Lemar, Adam Macbeth, Steven Swanson, Thomas Anderson, Brian Bershad, Gaetano Borriello, Steven Gribble, David Wetherall

November 2004 **ACM Transactions on Computer Systems (TOCS)**, Volume 22 Issue 4

Publisher: ACM Press

Full text available:  pdf(1.82 MB)

Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

Pervasive computing provides an attractive vision for the future of computing. Computational power will be available everywhere. Mobile and stationary devices will dynamically connect and coordinate to seamlessly help people in accomplishing their tasks. For this vision to become a reality, developers must build applications that constantly adapt to a highly dynamic computing environment. To make the developers' task feasible, we present a system architecture for pervasive computing, called & ...

Keywords: Asynchronous events, checkpointing, discovery, logic/operation pattern, migration, one.world, pervasive computing, structured I/O, tuples, ubiquitous computing

10 The elements of nature: interactive and realistic techniques



Oliver Deussen, David S. Ebert, Ron Fedkiw, F. Kenton Musgrave, Przemyslaw Prusinkiewicz, Doug Roble, Jos Stam, Jerry Tessendorf

August 2004 **ACM SIGGRAPH 2004 Course Notes SIGGRAPH '04**

Publisher: ACM Press

Full text available:  pdf(17.65 MB)

Additional Information: [full citation](#), [abstract](#)

This updated course on simulating natural phenomena will cover the latest research and production techniques for simulating most of the elements of nature. The presenters will provide movie production, interactive simulation, and research perspectives on the difficult task of photorealistic modeling, rendering, and animation of natural phenomena. The course offers a nice balance of the latest interactive graphics hardware-based simulation techniques and the latest physics-based simulation techni ...

11 High dynamic range imaging



Paul Debevec, Erik Reinhard, Greg Ward, Sumanta Pattanaik
August 2004 **ACM SIGGRAPH 2004 Course Notes SIGGRAPH '04**

Publisher: ACM Press

Full text available: pdf(20.22 MB) Additional Information: [full citation](#), [abstract](#)

Current display devices can display only a limited range of contrast and colors, which is one of the main reasons that most image acquisition, processing, and display techniques use no more than eight bits per color channel. This course outlines recent advances in high-dynamic-range imaging, from capture to display, that remove this restriction, thereby enabling images to represent the color gamut and dynamic range of the original scene rather than the limited subspace imposed by current monitor ...

12 Improving storage system availability with D-GRAID



Muthian Sivathanu, Vijayan Prabhakaran, Andrea C. Arpaci-Dusseau, Remzi H. Arpaci-Dusseau

May 2005 **ACM Transactions on Storage (TOS)**, Volume 1 Issue 2

Publisher: ACM Press

Full text available: pdf(700.30 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

We present the design, implementation, and evaluation of D-GRAID, a gracefully degrading and quickly recovering RAID storage array. D-GRAID ensures that most files within the file system remain available even when an unexpectedly high number of faults occur. D-GRAID achieves high availability through aggressive replication of semantically critical data, and fault-isolated placement of logically related data. D-GRAID also recovers from failures quickly, restoring only live file system data to a h ...

Keywords: Block-based storage, Disk array, RAID, fault isolation, file systems, smart disks

13 Serverless network file systems



T. E. Anderson, M. D. Dahlin, J. M. Neefe, D. A. Patterson, D. S. Roselli, R. Y. Wang
December 1995 **ACM SIGOPS Operating Systems Review , Proceedings of the fifteenth ACM symposium on Operating systems principles SOSP '95**, Volume 29
Issue 5

Publisher: ACM Press

Full text available: pdf(2.48 MB) Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#)

14 Cryptography as an operating system service: A case study



Angelos D. Keromytis, Jason L. Wright, Theo De Raadt, Matthew Burnside
February 2006 **ACM Transactions on Computer Systems (TOCS)**, Volume 24 Issue 1

Publisher: ACM Press

Full text available: pdf(669.12 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

Cryptographic transformations are a fundamental building block in many security applications and protocols. To improve performance, several vendors market hardware accelerator cards. However, until now no operating system provided a mechanism that allowed both uniform and efficient use of this new type of resource. We present the OpenBSD Cryptographic Framework (OCF), a service virtualization layer implemented inside the operating system kernel, that provides uniform access to accelerator functio ...

Keywords: Encryption, authentication, cryptographic protocols, digital signatures, hash functions

15 Distributed operating systems



Andrew S. Tanenbaum, Robbert Van Renesse

December 1985 **ACM Computing Surveys (CSUR)**, Volume 17 Issue 4

Publisher: ACM Press

Full text available: pdf(5.49 MB)

Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#), [review](#)

Distributed operating systems have many aspects in common with centralized ones, but they also differ in certain ways. This paper is intended as an introduction to distributed operating systems, and especially to current university research about them. After a discussion of what constitutes a distributed operating system and how it is distinguished from a computer network, various key design issues are discussed. Then several examples of current research projects are examined in some detail ...

16 Configurable isolation: building high availability systems with commodity multi-core processors



Nidhi Aggarwal, Parthasarathy Ranganathan, Norman P. Jouppi, James E. Smith

June 2007 **ACM SIGARCH Computer Architecture News , Proceedings of the 34th annual international symposium on Computer architecture ISCA '07**, Volume 35 Issue 2

Publisher: ACM Press

Full text available: pdf(458.30 KB)

Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

High availability is an increasingly important requirement for enterprise systems, often valued more than performance. Systems designed for high availability typically use redundant hardware for error detection and continued uptime in the event of a failure. Chip multiprocessors with an abundance of identical resources like cores, cache and interconnection networks would appear to be ideal building blocks for implementing high availability solutions on chip. However, doing so poses significant ...

Keywords: chip multiprocessors, fault isolation, high availability

17 Selected IR-related dissertation abstracts



Susanne M. Humphrey

September 1989 **ACM SIGIR Forum**, Volume 24 Issue 1-2

Publisher: ACM Press

Full text available: pdf(3.70 MB)

Additional Information: [full citation](#)

18 Projectors: advanced graphics and vision techniques



Ramesh Raskar

August 2004 **ACM SIGGRAPH 2004 Course Notes SIGGRAPH '04**

Publisher: ACM Press

Full text available: pdf(6.53 MB)

Additional Information: [full citation](#)

19 The Conquest file system: Better performance through a disk/persistent-RAM hybrid design



An-I Andy Wang, Geoff Kuenning, Peter Reiher, Gerald Popek

August 2006 **ACM Transactions on Storage (TOS)**, Volume 2 Issue 3

Publisher: ACM Press

Full text available:  pdf(1.34 MB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

Modern file systems assume the use of disk, a system-wide performance bottleneck for over a decade. Current disk caching and RAM file systems either impose high overhead to access memory content or fail to provide mechanisms to achieve data persistence across reboots. The *Conquest* file system is based on the observation that memory is becoming inexpensive, which enables all file system services to be delivered from memory, except for providing large storage capacity. Unlike caching, *Con* ...


Keywords: *Persistent RAM, file systems, performance measurement, storage management*

20 [Compiler transformations for high-performance computing](#)



David F. Bacon, Susan L. Graham, Oliver J. Sharp
December 1994 **ACM Computing Surveys (CSUR)**, Volume 26 Issue 4

Publisher: ACM Press

Full text available:  pdf(6.32 MB) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#), [review](#)

In the last three decades a large number of compiler transformations for optimizing programs have been implemented. Most optimizations for uniprocessors reduce the number of instructions executed by the program using transformations based on the analysis of scalar quantities and data-flow techniques. In contrast, optimizations for high-performance superscalar, vector, and parallel processors maximize parallelism and memory locality with transformations that rely on tracking the properties o ...

Keywords: compilation, dependence analysis, locality, multiprocessors, optimization, parallelism, superscalar processors, vectorization

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